

forts are made for absolute quiet in private wards, while in the general wards (where often four or five are simultaneously in labor) the maintenance of quiet is often difficult—and yet, even in these latter cases the results have been quite satisfactory.

Women from all parts of the world appear in Freiburg for the treatment, and quite a few I noted to be from the eastern part of the United States.

To conclude, I was profoundly impressed with what I saw in Freiburg and Munich, and I believe that the treatment, properly carried out, is a boon to parturient women.

Dr. W. E. Libby: In the University Hospital we have had experience with 20 cases. Of the 20, 10 have been primiparae and 10 multiparae. Our technic is that followed at Freiburg, and while I do not want to draw any conclusions, I should like to give you a few impressions received from these 20 cases.

Of these cases, 16 have been successful as far as the mother is concerned. Two were unsuccessful, although one of the cases received 12 doses, and two others were only partially successful.

From this series of cases I will make three observations: First, the effect upon the mother, where the anesthesia has worked has been a complete success. She knew nothing that happened after the second injection; and, even though we have made several examinations and have moved the patient from one room to another, she has known nothing about the labor. The baby is not removed from the room and we do whatever repair is necessary without anesthesia.

Second, the effect upon the child: here I have to disagree with Dr. Wakefield. We have had only one death, and autopsy showed that it was due to a congenital heart lesion. In one case I worked about one-half hour with the child before it was all right, and now, in every case when I see the head coming, I have hot and cold water prepared in case resuscitation of the child is necessary. This asphyxiation is, however, only temporary and in from 10 to 15 minutes the child is in a normal condition.

Third, the effect upon labor: I am satisfied, just from these few cases, that the labor is prolonged, that the pains are in some cases irregular and infrequent. The first stage is slow and in the second stage the pains do not seem as strong, and I think in the long run this will necessitate more frequent instrumental deliveries. In several of these cases the mother has been excited, and though I told her to push and bear down she would not do it. She would become more irritable and excitable and thrash about in bed. In these cases I have given pituitrin, but the patients would do no better.

From these few cases, I can say that as far as the mother is concerned, the anesthesia is without danger. As far as the baby is concerned, it may not be so free from danger; however, the fetal asphyxiation is only temporary. As far as the labor is concerned, it may be prolonged and instrumental delivery may be required more often.

A. Newman: I would like to ask Dr. Breitstein and Dr. Wakefield whether they have noticed any effect on the secretion of milk afterwards?

L. I. Breitstein, closing discussion: I want to say that morphin-scopolamin is like any other anesthetic in this respect—that is, it is not fool-proof. You have to watch it, and the safety with which it is administered depends upon the one who administers it. If you have an especially trained anesthetist, the results are better.

About waking the patient up to give her a sleeping potion, that is not exactly the thing we do. If the patient is asleep she is not disturbed, but if she awakens or comes out of her semi-unconscious condition, that is the time we interrogate her. I

believe this memory test is the test we should adhere to. If you give too much narcotic you bring about muscular relaxation, and that is apt to prove dangerous because it produces atonic hemorrhage. If you give too little she will remember, and the treatment is for naught. You have to get between the two, and that you can only do, I believe, by the memory test.

As to contra-indications, the patient should be examined from four to six weeks before she goes into labor and measurements made. If there is any disproportion between the size of the mother's pelvis and the size of the baby's head, this treatment is not suited for this particular case. Again, it should not be instituted when labor is far advanced, as in the second stage.

About keeping the patients in bed or getting them up early, I am inclined to be a little conservative. I do not get my patients up early. I prefer to keep them in bed ten days.

As to the size of the dose of scopolamine used, Kronig in his paper, read at the meeting in Chicago, November, 1913, said that after working on five thousand cases he has formed a schedule which he uses for the general run of women in good physical condition. That is the schedule I follow. In the first two injections, the dose of scopolamine is 0.00045 gm. or 1/150 gr. The dose of the third injection and those used subsequently consists of 0.00015 gm. or 1/450 gr. scopolamine. If Dr. Wakefield would total up the amount of scopolamine used, he would find that I employ the same amount if not less scopolamine than he uses.

In reply to Dr. Newman's question, I will say that scopolamine has a tendency to dry up secretions just like atropine. The breast secretion contains traces of scopolamine, and for that reason I do not put the babies to the breast for the first twelve hours. A breast pump is used. The milk supply is rarely diminished; however, I will state that the tendency to engorgement of the breasts generally seen about the third day is noticeably diminished.

A POSSIBLE EXPLANATION OF THE CONFLICTING REPORTS ON TWILIGHT SLEEP.*

By STELLA LEHR, M. D., Berkeley.

A number of physicians have expressed opposing views on the "twilight sleep." My observations in Freiburg and subsequent experience in New York have convinced me of the necessity of an explanation. My personal experience afforded me a satisfactory explanation, and I offer it to you for your consideration.

It is very simple. There are two methods of giving the twilight sleep—diametrically opposed in principle.

First: The original Gauss-Krönig method, having for its keynote individualization of dosage; the drugs administered in the smallest possible amount to meet the varying susceptibility of the patient; morphine and scopolamin being used; morphine given only with the first dose.

Second: The Siegel method, having for its keynote standardization; the drugs administered in stated doses at regular intervals disregarding the

* Read before the Alameda County Medical Association, January, 1915.

susceptibility of the patient; narcophine substituted for morphine, and repeated with every third dose.

The latter method is based upon the results of Gauss' experience in working out the first method; theoretically it does not appear very different, as the total amount of drugs and the average length of labor were taken into account in making out the methodically repeated dosage, which is the distinguishing feature of the Siegel method. Its practical application does not work out so well, as the report of my cases will show.

In Freiburg the original twilight sleep was given only in the first-class wards and therefore not available for clinical purposes. In the third and fourth class wards the Siegel method was used and this was what the visiting physician saw. The unfortunate circumstance was that the observer was not informed that she was witnessing a method on trial, and not an approved and accepted one, as so many physicians have concluded.

My experience was a case in point. I was in Freiburg five days before I realized that what I was seeing every day in the third and fourth wards did not represent the latest approved method. From my previous reading I had received the impression that the injections were given to meet the susceptibility of the patient and her reaction judged by the memory test and various reflexes.

The first day I visited the ward, there were three cases in progress, and while I observed all three I concentrated my attention upon one. The first dose was given when contractions were strong, regular, and five minutes apart, and in ten minutes the patient was asleep, waking only at the climax of the pain. I watched in vain for any test of the patient's condition and indications for further dosage. What I did observe was that the drugs were repeated methodically and soon the patient was snoring—in a very deep sleep. Upon inquiry I was told that as long as the patient could be aroused, there was no danger. Later on two injections of pituitrin were used, and at the final stage inhalations of ethyl chloride were given. The baby was pinkish lavender in color and did not breathe for about ten minutes. During that time various means of resuscitation were used: the baby was suspended by the feet, and body vigorously slapped, then laid on a table, and chest rhythmically pounded; then body immersed alternately in hot and cold water, and finally intratracheal catheterization used. After witnessing this I naturally concluded that the twilight sleep was to be used very conservatively or better still not at all.

After five days I learned through American mothers whom I met socially that this method was only an experiment and did not represent the original painstakingly worked out Gauss-Krönig method. During these first few days the results seen in five cases were not favorable and a number of American physicians had come and gone carrying with them this unfavorable impression. During the succeeding five days, four cases were seen in which the babies were in perfect condition and cried immediately after birth; in two other cases, respiration was only slightly delayed.

These varied results, suggested the necessity of individual dosage. It seemed unjust both to the original treatment and the visiting physicians to receive such misinformation. When, in an interview with Professor Krönig, I told him of my experience, and the fact that a number of physicians had come and gone uninformed of the truth, he was perturbed and said, "That should not be." He also said that the Siegel method was not an improvement on the original, but an attempt to overcome the necessity for the constant watchfulness which made the original method almost impracticable for the general practitioner. Siegel himself states in his report that it is an attempt to simplify the method but he does not recommend it in private practice. Dr. Krönig said they were entirely satisfied with the original method and considered it perfected. He also promised to remedy the condition with regard to visitors; that was only a few days before the war, which, of course, put an end to clinics.

I was amazed upon reaching New York to realize the extent of the misconception regarding the two methods. Out of seven hospitals using the twilight sleep, only two were using the correct Gauss-Krönig method. These were the Long Island College Hospital under Dr. Polak and the Gouverneur Hospital in New York under Dr. Knipe. Both of these men were in Freiburg this summer and met Dr. Krönig personally. The other five hospitals were using narcophine, and some followed the Siegel scheme; most have since adopted the original.

During a period of six weeks I observed the work of the Gouverneur Hospital and my disapproval and conservative attitude was entirely changed. The results were most satisfactory and I shall state my observations as concisely as possible. The Gauss-Krönig method was strictly adhered to. The patients were placed in a quiet darkened room, eyes bandaged and cotton in ears. The first injection was not given until it was certain that labor was in progress. Each patient seemed to have an individual reaction and close observation of the effect of the first dose gave a hint as to subsequent dosage.

The signs to be watched for, are flushing of the face, thirst, sleep (how soon apparent and how deep). If these signs are marked *soon* after the first dose it may be assumed that the patient is susceptible. The effect upon pain sensation is to diminish it, of course, but in addition to this all anticipation of pain is removed. The mother sleeps between the contractions, awakens only at the climax, and is asleep again almost before it is over. This effect gives the observer the impression of a lengthened interval between pains. True observation can only be made by keeping the hand upon the abdomen, where the contraction may be felt from the very beginning to the end. If the interval should really be lengthened, it is another sign of a susceptible patient. It is gauging this "specific susceptibility" that gives the cue for subsequent dosage, and constant observation is necessary to success. After the first dose has had effect, the memory test is applied and repeated at inter-

vals of forty-five minutes. Experience gives such familiarity that the memory test may be used infrequently, but it is indispensable to the beginner. It is best to make this test as inconspicuous as possible, and asking how many injections have been given is usually sufficient. Most women remember only three, for it is about the third dose that amnesia is evidenced. In a properly administered dosage there is no diminution in the force of the contraction, and dilation goes on more rapidly than normally. Mothers who have received this treatment say they remember only two or three pains after the first injection, and the intensity of these gradually decrease. This shows that analgesia is obtained quite early.

Many physicians have asked wherein this treatment has any advantage over chloroform, ether or nitrous oxide. The answer is here—it is a **FIRST STAGE HELPER**, and here it practically stands alone.

The second stage is lengthened—I think all agree upon that point; and if there is a disadvantage at all, it is here, for in many cases it does away with that voluntary effort which the fully conscious patient would exercise. In most observed cases, no demand was made upon the patient in order to avoid arousing her. The latter part of the labor was prolonged and if pituitrin seemed indicated was administered, but occasionally low forceps were used to lift the head out of the vagina as it were.

In Freiburg I noticed a very definite correlation between poor abdominal pressure and the necessity for the use of pituitrin. I also noticed that when pituitrin was used, forceps were usually necessary to complete the delivery.

As a large percentage of the women of Baden have contracted pelves, it is difficult to determine whether the necessity for forceps was due to this fact, or to the action of the drugs used according to the Siegel scheme to produce the twilight sleep.

Dr. Sears of Boston, who visited Dr. Knipe's ward, suggested that a firm but adjustable abdominal bandage would be of service in affording the pressure and resistance which relaxed abdominal muscles failed to give. He reported having used it for years and considered it avoided the necessity for pituitrin. The bandage should be used as carefully as pituitrin and only after dilatation is complete. During the birth of the head a general anesthetic should be used, as the twilight sleep is too light to be undisturbed by the final expulsive pains as well as the additional light and bustle attendant upon the birth.

The third stage, or the expulsion of the placenta, usually ends normally. It is important to avoid premature manipulation of the uterus and only light abdominal palpation should be used to keep informed of the condition of the parts. Only in cases of hemorrhage or prolonged retention of the placenta should the Credé manipulation be used. A routine hypodermic of ergotol is used in the Gouverneur Hospital.

The after treatment as given in Freiburg is not a necessary part of the twilight sleep. The absence of exhaustion led to the adoption of early rising, but it must be remembered that the patient

is prepared for it by a system of exercises instituted eight or twelve hours after labor. The uterus is usually below the pelvic brim by the fifth or sixth day. In the first-class wards a system of hydrotherapy is instituted about the tenth day, consisting of sprays of various degrees of temperature and force used upon the abdomen. The exercises and early rising are being tentatively tried out at the Gouverneur Hospital. The patients are advised to return for examination over a considerable period of time, and reports show no unfavorable results. It is realized, however, that a long period must elapse to judge of the final result.

The children as seen at this hospital showed no ill effects of the twilight sleep, and except for two or three which had the cord about the neck, they all cried immediately.

The effect upon the child is watched by auscultation of the heart every 15 minutes. If the drug is given too rapidly for the mother to eliminate, or too near the birth, the infant suffers from a cumulative effect which is evidenced by changes in the foetal-pulse rate and at birth by depression of the respiration evidenced by postponement or enfeeblement of the initial inspiratory movement. My observation has convinced me that this can be avoided by carefully regulated dosage. Gauss considers the condition of the child a criterion of the proper administration of the drugs. All the cases seen at the Gouverneur Hospital gave perfect results as to the child, thus proving the safety of "Individualization of dosage."

So much in explanation of the opposing views of those who have visited the Freiburg Clinic during the last year. There are another group of physicians who dismiss the subject of twilight sleep with the remark, "We tried it years ago and discarded it as dangerous." Gauss himself explains those early failures as due to several factors.

The first and very important one was the inability to get a stable preparation of the drug. That now has been overcome.

Second—Failure to study the individual patient in administering the drug.

Third—Attempting to force the condition in too short a time, causing a relative overdosing.

Fourth—Beginning the injections too early—before it was determined that the pains were those of true labor and not the false pains present in uterine inertia, which is the greatest contraindication to treatment.

Fifth—Attempting to do away with all evidence of pain—which means saturating infant with the narcotic drug—and thus jeopardizing the infant's life.

Gauss' report of the second 500 cases shows a great improvement in all ways over the first 500 cases—when he was studying the action of the drugs—alone and together and working out the memory test. Instead of giving it up as dangerous, he eliminated the danger by constant experimentation and observation, and those who have read the literature giving the details of his painstaking work, and have seen well-conducted cases adhering closely to his method, cannot help but agree

with Dr. Krönig that it is an efficient method of eliminating the fear and pain of parturition.

Preparation of the Drugs. Scopolamin hydrobromide is derived from the scopol plant; hyoscine hydrobromide from hyoscyamus. Both belong to the same genus and as chemists can find no difference, they are considered identical. Scopolamin may be used in fresh solution, or be preserved in a ten per cent. solution of mannit-alcohol according to Straub's formula. If ampuled to be kept for any length of time, Jena glass should be used, as there is some chemical reaction between the solution and the lead in flint glass.

Test of Solution. Kessel has shown that one drop of a weak solution of potassium permanganate is a delicate test for apotatropin, one of the dangerous decomposition products. It gives a brownish yellow color when present.

Strength of Solution:

Scopolamin 1 cc—0.0003 gms. (1/200 gr.)

Morphine 1 cc—0.01 gms. (1/6 gr.)

Narcophine 1 cc—0.03 gms. (1/2 gr.). Substituted for morphine in the Siegel method.

Narcophine is claimed to be less depressant to the respiratory function of the child, and to have other advantages over morphine. The Council on Pharmacy and Chemistry was unable to accept the therapeutic claims for it. (*Journal A. M. A.*, Nov. 21, 1914.)

Dosage. The first dose in scopolamin-morphine-amnesia is:

Scopolamin hydrobromide 0.003 (1/200 gr.)—0.00045 gm. (1/133 gr.) and

Morphine hydrochloride 0.01 gm. (1/6 gr.)

Scopolamin is repeated as necessary, the second dose usually in about three-fourths hour, but it may be two hours, and the dose may be the same or less than the first. Subsequent doses are decreased about one-half, and the interval lengthened. The action of the morphine is comparable to that of nitrous oxide in a general ether anesthetic; it gets the patient under so that scopolamin may get in its work and accomplish "forgetfulness of present events." Gauss' early ill effects upon labor and upon the child were due to repeated doses of morphine. His advice is to allow generally two hours to elapse between the last injection and the probable time of birth. The average number of doses is five or six. Amnesia sets in about the third dose. There is a very small percentage of patients unaffected by the drugs. It is needless to say that the twilight sleep requires a high degree of obstetrical knowledge.

General Conclusion. The twilight sleep requires the same careful administration as any anesthetic. It should be given in a well-equipped hospital. It offers a means of alleviating the pains of labor, and if the dose is individually adjusted, is without danger to mother or child.

OBSERVATIONS ON THE DAMMERSCHLAF OR TWILIGHT SLEEP.*

By B. F. SANDOW, M. D., Oakland.

It is the imperative duty of the physician to relieve pain, whatever the indication and whatever the cause, and it is the obvious duty of the obstetrician to alleviate the pains of childbirth. This principle has been recognized from the earliest times, when our art was in its most primitive state, and attempts at pain mitigation and palliation have been made among the uncivilized and the aborigines.

This great problem of pain alleviation in the parturient woman is still confronting us today and many and various attempts have been made to meet it. Chloroform, ether, nitrous oxide, chloride of ethyl, morphine, scopolamin, heroin, antipyrin, alcohol, cocaine, spinal anesthesia, and other agencies have been employed to lessen the pain in labor. All these means afford relief in some measure, but to the employment of some well founded objections developed, while others proved to be ineffectual and abortive.

You are all more or less familiar with the "Dammerschlaf" or "Twilight Sleep," the scopolamin morphine treatment in childbirth. Its elaboration and employment for the relief of labor pains marks a distinct advance in obstetrical science. My aim in addressing you is to render a statement of my observations and my experience with this treatment in about ninety cases, while doing postgraduate work during the past year at Freiburg and München.

As early as 1902, Steinbüchel in Germany employed scopolamin and morphine in obstetrics for the relief of labor pains. He emphasized the superior advantages of it over all the heretofore known methods. Among his followers Krönig and Gauss in Freiburg in particular elaborated this treatment, and Gauss in 1906 published a record of his first 600 cases. When he and Krönig visited this country last year a further report of 3000 successful cases, from the Freiburg clinic, was submitted at the meeting of the American Gynecological Society in Chicago. Following Gauss' first report, many obstetricians in this country gave the method a trial, but soon bad results were reported by many and the treatment came into disrepute and was practically abandoned as dangerous, asphyxiation and death of infants as well as hemorrhage and prolongation of labor being claimed. According to Knipe, New York, in a recent paper read before the Section on Obstetrics in the New York Academy of Medicine, the reported bad results were due:

1. To poor preparations of scopolamin.
2. To the use of too much morphine.
3. To attempts to achieve absolute painlessness in childbirth.
4. To a technic which was entirely different from that used and recommended by Gauss.

I fully concur with Knipe and believe that with the adoption of and adherence to the Freiburg

* Read before the Alameda County Medical Association, February, 1915.